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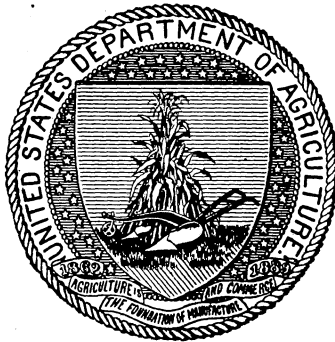
FARMERS' BULLETIN 324.

SWEET POTATOES.

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF PLANT INDUSTRY, OFFICE OF THE CHIEF,
Washington, D. C., March 25, 1908.

SIR: I have the honor to transmit herewith a manuscript entitled "Sweet Potatoes," by Mr. W. R. Beattie, Assistant Horticulturist, and recommend that it be published as a Farmers' Bulletin to supersede the former publication of this title issued as Bulletin No. 129 of the same series.

The sweet potato is now one of the most important of our truck crops. It has a wide range of utility, both as a money crop and for home consumption, and it is especially adapted to growing on the "worn-out" cotton and tobacco lands of the Southern States.

Respectfully,

B. T. GALLOWAY,
Chief of Bureau.

Hon. JAMES WILSON, *Secretary of Agriculture.*

CONTENTS.

	Page.
Introduction.....	3
Areas adapted to sweet potato culture.....	4
Climatic conditions required.....	4
Character of soil adapted to sweet potatoes.....	5
Fertilizers for sweet potatoes.....	6
Propagation of plants.....	9
Preparation of land for sweet potatoes.....	16
Setting the plants.....	18
Cultivation of sweet potatoes.....	22
Diseases.....	24
Insects.....	26
Harvesting sweet potatoes.....	26
Storage of sweet potatoes.....	29
Temperature and ventilation of storage houses.....	33
Loss from shrinkage while in storage.....	34
Marketing during winter months.....	34
Varieties of sweet potatoes.....	35
Cost of production and returns.....	38
Uses of sweet potatoes.....	38

ILLUSTRATIONS.

	Page.
Fig. 1. Map showing range of production of sweet potatoes.....	4
2. A good hill of sweet potatoes.....	5
3. A one-horse fertilizer sower in operation.....	8
4. A manure-heated hotbed.....	11
5. A kiln or furnace heated bed.....	11
6. Cross section of pipe-heated plant bed.....	12
7. Sweet potato sets, or "drawings".....	15
8. Roller for marking distances to plant.....	18
9. Drag or rake marker.....	19
10. A trowel and a dibble used in setting plants.....	19
11. Setting sweet potato plants by hand.....	20
12. Tongs, shovel, and forked dibble for setting plants.....	21
13. Transplanting machine in operation.....	22
14. A field of sweet potatoes after the vines have practically covered the ground.....	23
15. Device for hilling previous to "laying by".....	24
16. Sweet potato affected with black-rot.....	25
17. Spading fork adapted for digging sweet potatoes.....	27
18. Special plows for digging sweet potatoes.....	27
19. Section of outdoor pit.....	29
20. Outside cellar.....	30
21. Cross section of large storage house.....	31
22. Wagon and baskets adapted for transporting sweet potatoes.....	32
23. Sweet potato barrels and device for pressing the heads into place.....	35
24. Some of the commercial types of sweet potatoes.....	36

SWEET POTATOES.

INTRODUCTION.

With the passing of each year the sweet potato is becoming of greater importance as a commercial truck crop in the United States. During a long period it has formed one of the principal sources of food for the people of the Southern States and of tropical America. As a commercial truck crop the sweet potato would be included among the five of greatest importance, ranking perhaps about third in the list. As a food for the great mass of the people living in the warmer portions of our country the use of this crop is exceeded by hominy and rice only. In many of the islands of the Pacific, especially in the Philippines, the sweet potato is the principal vegetable food for large numbers of the lower classes, at certain seasons being almost the only food available.

The sweet potato industry in this country is readily divided into two classes of production: (1) For home use and (2) for market. A quantity sufficient for home use can be grown under a wide range of conditions, while production on a commercial scale is somewhat restricted by climate and soil and also by market and transportation facilities. The larger eastern markets are now well supplied, but there are sections where the people have not as yet become accustomed to the use of sweet potatoes in large quantities. The field for the production and use of sweet potatoes is very broad, and this crop promises to become of more general farm importance.

In view of the constantly increasing interest in sweet potatoes it is the purpose of this bulletin to give simple cultural directions covering their production both for home use and for market, including the soil and its preparation, the propagation of the plants, planting, harvesting, storing, and marketing, together with the uses of sweet potatoes for stock feeding and for similar purposes.

The sweet potato is of a tropical nature, its original home probably being the West Indies and Central America. The true sweet potato, as we have it growing in the United States, belongs to the morning-glory family, its botanical name being *Ipomoea batatas*. Through-

out the Southern States the sweet potatoes having moist flesh are commonly known as "yams" and those having dry flesh as sweet potatoes. The name "yam" is misleading and properly belongs to a distinct class of plants that are confined almost entirely to the Tropics.

AREAS ADAPTED TO SWEET POTATO CULTURE.

Owing to the tropical nature of the sweet potato it naturally thrives best in the South Atlantic and Gulf Coast States, but it may be grown for home use as far north as southern New York and westward along that latitude to the Rocky Mountains. The areas suited to commercial production, as indicated by the shaded portions of the

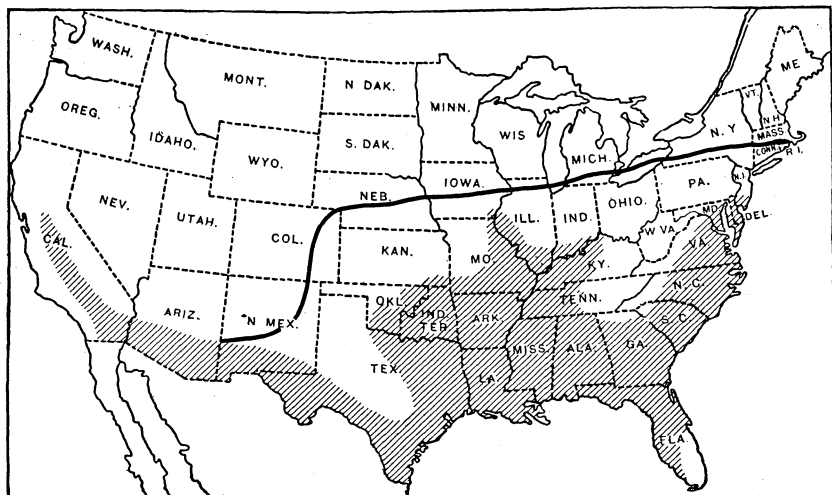


FIG. 1.—Map showing range of production of sweet potatoes. The shaded portion represents the area adapted to commercial growing. The dark line represents the northern limits of sweet potato culture for home use.

map shown as figure 1, extend from New Jersey southward and westward to Texas, and are found again in the central valleys of California. In the Mississippi Valley the commercial area extends as far north as the southern part of Iowa, Illinois, and Indiana. The region around Louisville, Ky., is noted for excellent crops of sweet potatoes.

CLIMATIC CONDITIONS REQUIRED.

The climatic requirements for the production of sweet potatoes on a commercial scale are (1) a growing period of at least four and a half months without frost, (2) warm nights and abundant sunshine during the day, and (3) a moderate rainfall during the growing period.

Where irrigation is depended upon for the supply of moisture, the greatest quantity of water should be applied between the time the plants are set in the field and the time when the vines practically cover the ground. If too much water is applied during the latter part of the season the result may be an abundant growth of vine and a small yield of stringy potatoes. For some time before harvesting the crop the water should be withheld altogether, in order that the roots may ripen properly.

The climatic conditions prevailing throughout the shaded portion of the map (fig. 1) are well suited to the requirements of the sweet potato, except that irrigation is necessary in the western part, including a portion of Texas.

CHARACTER OF SOIL ADAPTED TO SWEET POTATOES.

Sweet potatoes thrive on a moderately fertile sandy loam which does not contain an excess of organic matter. They are frequently grown upon almost pure sand, especially where the subsoil is a yellow clay. Soils containing considerable calcium or underlain with limestone are well adapted to the growing of the crop. The sweet potato is exceptional in that a fairly good crop can be grown upon soils that are too poor for the production of the majority of farm crops. Sweet potatoes yield a fair crop on the "worn-out" tobacco and cotton lands of the South, especially when used in a rotation including some leguminous crop for increasing the humus in the soil. Like many other crops, the sweet potato thrives on newly cleared land, but the crop should not be planted continuously in the same place. With the sweet potato, as with other crops, rotation is the keynote of success.

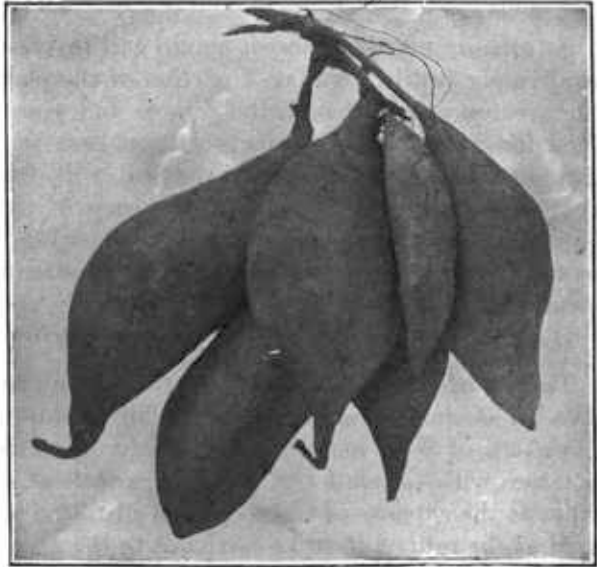


FIG. 2.—A good hill of sweet potatoes. To be perfect the lower ends of some of the larger potatoes should be more rounded.

Good drainage is essential, the original idea of planting upon high ridges being for the purpose of securing better drainage. The surface soil should extend to a depth of 6 or 8 inches, and the subsoil should be of such a nature that it will carry off excessive moisture without leaching away the fertilizers applied to the land. Too great a depth of loose surface soil or an alluvial soil having no subsoil will produce long, irregular potatoes that are undesirable for marketing. Planting upon land having a loose, sandy surface soil underlain by a well-drained clay subsoil will tend to produce the type of rather thick, spindle-formed potato that commands the highest price. This type is illustrated in figure 2, which shows a hill containing five marketable potatoes. The depth of plowing is a prominent factor in the preparation of land for sweet potatoes, and on soils of too great depth before the subsoil is reached very shallow plowing should be practiced, leaving the soil firm beneath, against which the roots must force their way. If the surface soil is of insufficient depth, it should be gradually increased by plowing a little deeper each year or by subsoiling in the furrow behind the regular turning plow.

FERTILIZERS FOR SWEET POTATOES.

As already noted, the sweet potato will thrive on soils that are only moderately fertile. The root portion of the plant is the part having the greatest value, though the foliage and vines have some value as food for certain kinds of stock. It has been found that an excessive amount of organic matter in the soil will frequently produce an abundant growth of vines at the expense of the roots. It has also been noted that the potatoes will be small and the yield unsatisfactory on soils that do not contain sufficient organic matter to produce a fair growth of vine.

USE OF STABLE MANURE.

The use of stable manure as a fertilizer for sweet potatoes is recommended on lands that are deficient in organic matter. Heavy applications of fresh manure shortly before planting the land to sweet potatoes will stimulate not only the growth of weeds but also of the vines at the expense of the roots. Well-rotted stable manure may be used at the rate of 10 to 15 cartloads to the acre, spread broadcast or beneath the ridges and harrowed into the soil, but it is always well to apply the manure with the crop grown the previous season. By this method the manure will become thoroughly incorporated with the soil and become somewhat reduced before the sweet potatoes are planted upon the land.

Stable manure will be found most beneficial on worn-out soils, but on the more fertile soils its use should be restricted and the method of application carefully studied. In some sections where the organic

matter in the soil is insufficient all kinds of vegetable matter, including manure, pine needles, corn fodder, straw, and stubble, are turned into the land to bring up the fertility. The sweet potato vines will go a little way toward keeping up the organic matter in the soil, but have a souring tendency and should be accompanied with a moderate application of lime or plaster.

Leguminous plants grown as cover crops or in the rotation will serve to keep up the organic matter in the soil the same as stable manure. Sweet potato growers are coming to realize the value of crimson clover for use in the rotation in which sweet potatoes are grown. If the land is planted to corn, crimson clover may be sown in the alleys at the time the corn receives its final cultivation. This will provide a covering for the land during the winter, and as the crimson clover starts into growth quite early in the spring a heavy crop is produced by the time it is necessary to plow the land for sweet potatoes. In order to secure the best results the crimson clover should be turned under not later than the appearance of the first blooms; if allowed to remain longer the stems become tough and do not decay quickly enough to be of benefit to the sweet potato crop which follows.

USE OF COMMERCIAL FERTILIZERS.

The sweet potato is one of the few of our crops that thrive equally as well (or better) upon commercial fertilizers as upon stable manure. A fertilizer for use on the majority of sweet potato lands should contain 3 to 6 per cent of nitrogen, 6 or 7 per cent of phosphoric acid, and 8 to 10 per cent of potash. Every grower should make a study of the requirements of his soil and apply the fertilizer that will give the best results. Many growers purchase the ingredients and mix their own special fertilizers, or use a standard fertilizer as a base and increase the percentage of certain elements by adding high-grade elementary ingredients. Some soils require that certain elements should be in a more available form than others; in the case of nitrogen it is often desirable to have a portion of that contained in the fertilizer quickly available and the remainder more slowly in order to feed the plants throughout the season.

A mixture adapted to the growing of sweet potatoes on most soils may be made by combining the following:

- 200 pounds of high-grade sulphate of ammonia, 25 per cent pure.
- 200 pounds of dried blood, or 300 pounds of fish scrap.
- 1,200 pounds of acid phosphate, 11 per cent pure.
- 400 pounds of high-grade muriate of potash, 50 per cent pure.

This mixture contains approximately 4.25 per cent of nitrogen, 6.6 per cent of phosphoric acid, and 10 per cent of potash. Nitrogen in two forms is present, the dried blood being quickly available and the

sulphate of ammonia more slowly, becoming available later in the season when the potatoes are forming.

Experience has demonstrated the necessity of having an abundance of potash in the fertilizers used for sweet potatoes. In experiments with fertilizers for this crop an increased yield of from 40 to 60 per cent has been noted on plots where a liberal application of potash had been made in comparison with plots to which no fertilizer was applied. In most cases the highest yield is secured where a complete, or balanced, fertilizer is used.

QUANTITY AND TIME OF APPLYING COMMERCIAL FERTILIZERS.

The quantity of fertilizer that may be profitably applied will be governed entirely by local conditions. Many growers do not depend



FIG. 3.—A one-horse fertilizer sower in operation.

upon commercial fertilizers, but merely apply from 200 to 300 pounds to each acre as a supplement to the organic matter and natural fertility of the soil. Others apply from 300 to 1,000 pounds according to the condition of the soil, while a few growers use a ton to the acre. The general rule is to apply the fertilizer in the row where the crop is to be grown, but where large quantities are used it should be distributed at least ten days before planting and thoroughly incorporated with the soil. An application of 1,000 pounds of high-grade fertilizer placed in the row at planting time has been known to injure seriously or kill the plants. Hand and one-horse distributors, similar to that shown in figure 3, which merely sow the fertilizer in the

row, are in use. Others are designed to scatter the fertilizer and work it into the soil, and tools that mark the land, sow the fertilizer, and throw up the ridges at one operation can be obtained. For the best results the fertilizer should be applied at least ten days before planting, or a portion of the fertilizer may be applied a month or more in advance and the remainder at the time of preparing the land for planting.

USE OF HARDWOOD ASHES AS A FERTILIZER.

Hardwood ashes are desirable for use on sweet potato land and may be applied at the rate of from 1,200 to 2,000 pounds to the acre. The value of wood ashes depends upon how much they have become leached, but hardwood ashes should contain from 6 to 8 per cent of available potash. Wood ashes also contain considerable lime.

USE OF LIME ON SWEET POTATO LAND.

Where large quantities of any green crop are plowed into the soil there is a tendency to sourness, and occasional applications of from 1 to 2 tons of lime to the acre are beneficial. The presence of an abundance of lime in soils devoted to the growing of sweet potatoes hastens the maturity of the crop and increases the yield. On poor soils the lime and potash work together to produce potatoes of uniform size and shape, but on rich or alluvial soils the tendency is toward the production of over-large and irregular roots. The lime should be applied the previous season, or at least the autumn before planting the land to sweet potatoes.

PROPAGATION OF PLANTS.

The more common varieties of the sweet potato have for a great many years been propagated by cuttings, or sets, taken either from the potatoes themselves or from growing vines, and as a result the plants have ceased to flower and produce seed. The greater portion of the commercial crop is grown from sets, or "draws," produced by sprouting medium-sized potatoes in a warm bed of soil. In the Southern States the seed potatoes are frequently cut into pieces in the same manner as Irish potatoes and planted in the row where they are to mature. Where several plants appear in one hill they are thinned, and those removed are used for planting other land. In the South Atlantic and Gulf Coast States the sweet potato is frequently propagated by making vine cuttings. A comparatively small bed of seed potatoes is planted quite early and the sets so produced are used to plant a small patch from which vine cuttings are taken later by the cartload for planting large fields. In the southern parts of Florida and Texas and on the South Sea Islands the potatoes may remain in the soil from year to year, being dug

only as required for use, those remaining over producing the sets for the following season's planting.

Where only a small area of sweet potatoes is to be grown for home use, the necessary plants can generally be secured from some one who makes a business of growing them. If an acre or more is to be planted it will in most cases be more economical to prepare a bed and grow the plants. The method of starting the plants will depend upon the locality and the acreage to be planted, the essentials being a bed of warm earth and a covering to protect the young plants during the early springtime.

SELECTION OF SEED.

The care of the seed potatoes during the winter is discussed later under the head of storage of sweet potatoes.

The potatoes that are to serve as seed from which to grow the plants for the next season's crop should always be selected at the time of digging and housing the crop. For seed purposes it is the custom to select the medium or under-sized potatoes, such as are too small for marketing. Those potatoes that will pass through a 2-inch ring or can be circled by the thumb and first finger of a man having a hand of average size are used for seed purposes.

The seed potatoes should be uniform in size and of the shape desired in the following year's crop. The seed should be free from cuts, bruises, decay, or disease of any kind. Throughout the handling of the seed potatoes they should not receive any treatment that would break eggs. The seed should always be handled and kept separate from the regular crop.

The oftener the seed is handled the greater the danger of decay, and it should not be sorted over until everything is ready for bedding.

The best seed is grown from cuttings taken from the regular plants after they have begun to form vines. These cuttings produce large numbers of medium or small-sized potatoes that are free from diseases and adapted for use as seed the following year.

MANURE-HEATED BEDS.

The ordinary hotbed is now in too common use to require a lengthy description, and as constructed by many of the sweet potato growers of the eastern shore of Virginia it consists of one or more long, narrow beds similar to those shown in figure 4.

The hotbeds are generally located where they will have protection on the north by a piece of pine woods, a hill, or buildings, and where no natural protection is available a wind-break consisting of pine boughs or corn fodder is usually erected. In preparing the hotbed, 8 to 12 inches of fresh horse manure are first trampled into the bottom of the excavation, and as soon as this has begun to heat 3 or 4

inches of sandy loam are spread evenly over the manure. The sash or other covering is then put on and the bed allowed to stand until

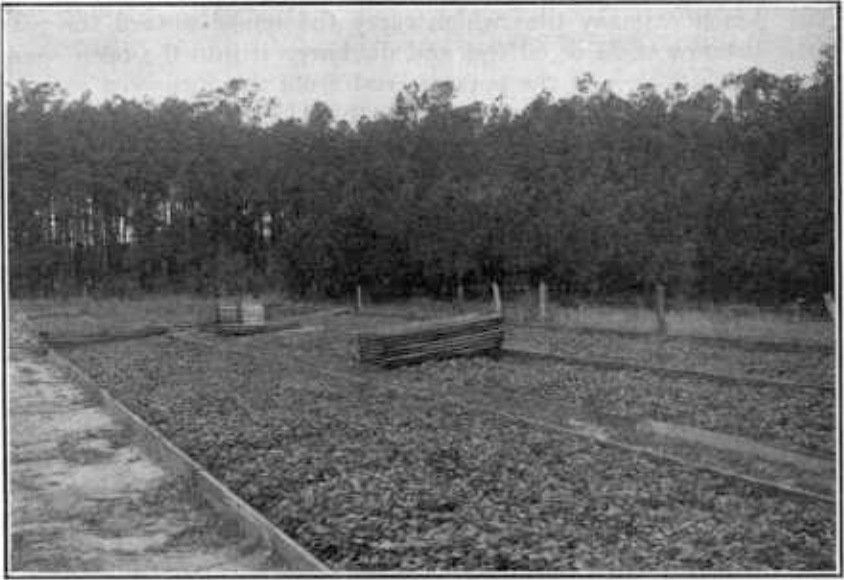


FIG. 4.—A manure-heated hotbed, showing the sash removed and piled where they can be easily placed upon the beds in case of danger from frost. Note the pine woods to the north and west of the plant beds.

the temperature of the manure falls to about 80° or 85° F. before the seed potatoes are put in.

KILN OR FIRE HEATED BEDS.

Where large numbers of plants are required and there is difficulty in procuring good manure for hotbed purposes, a large bed may be constructed with arrangements for supplying the heat by means of a brick furnace or a stove. An idea of the general plan of a bed of this kind can be most easily gained by reference to figure 5.

The side walls should be of stone, concrete, or brick, and a floor of



FIG. 5.—A kiln or furnace heated bed. (Redrawn from Bailey's Cyclopedia of Agriculture.)

boards upon timber supports is essential. From 4 to 6 inches of fine soil are placed upon the floor before bedding the potatoes, and a covering of about 3 inches of sifted soil or leaf mold is then added. The furnace

should be so constructed that it may be fired from the outer end or just inside a door opening into the space beneath the bed. The brick furnace extends a few feet only and connects with one or more 6-inch chimney tiles which carry the smoke toward the rear for a distance of 25 or 30 feet and discharge it into the open space beneath the floor. At the opposite end from the furnace a wooden chimney collects the gases and carries them to the open air. Owing to the moisture absorbed from the soil by the flooring, there is very small danger from fire, but if wood is used for fuel it may be well to place a screen of wire over the openings of the tiles in order to prevent the passage of sparks.

In order to secure a uniform temperature under all parts of the bed, it may be desirable to cover the furnace and horizontal chimney tiles with earth and to so construct the bed that there will be a gradual rise of the floor toward the chimney end.

PIPE-HEATED BEDS.

Where a steam or hot water boiler is in use for greenhouse or residence heating, a very satisfactory plant bed can be constructed by burying four or five lines of pipes in the soil beneath the bed and supplying the heat from the boiler. This has been found to be an ideal method, as the lines of pipes can be controlled by valves and the temperature of the soil in the bed kept at the desired point. If hot water heat is used the pipes should be laid with the soil in direct contact with them, but for steam the pipes should be surrounded with

3-inch or 4-inch tiles to prevent too rapid passage of the heat and the consequent burning of the soil. The pipes should be placed 10 or 12 inches below the bottom of the special soil in the bed, and 14 to 16 inches below the line of the seed

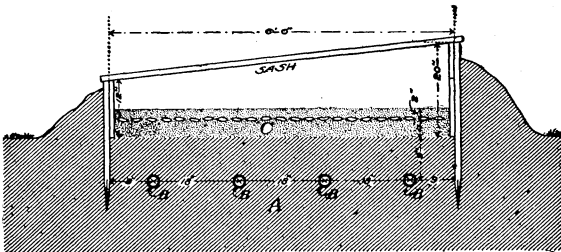


FIG. 6.—Cross section of pipe-heated plant bed. A, natural soil; B, hot water or steam pipes; C, sifted sandy loam or leaf mold.

potatoes. If the pipes are laid 18 inches apart an even distribution of heat will be secured. For hot water heating, 2-inch pipes should be employed, but 1½-inch pipes will be large enough for steam, provided the lines are not more than 60 feet in length. The lines of pipe should be carefully graded and have a uniform fall toward the return end; in fact, the rules governing greenhouse heating apply to the piping of beds of this kind. A general idea of the construction of a pipe-heated bed may be gained from the cross section shown as figure 6.

COVERINGS FOR PLANT BEDS.

Throughout the Gulf Coast and South Atlantic States it may not be necessary to provide a cover to retain heat or protect the plants from cold, but farther north some form of cover should be provided. In the northern part of the sweet potato district glazed hotbed sash, each about 3 by 6 feet in size, are most commonly used. In warmer sections a covering of light canvas or heavy muslin will be sufficient for the protection of the plant bed. Where sash are used they should always slope to the south, in order to admit the greatest amount of light. A canvas or muslin cover should be supported either upon laths or wires in such manner that water will drain off and not form puddles and drip upon the bed. Provision should also be made for rolling up the canvas on bright days to admit sunlight and secure ventilation.

Toward the end of the time that the plants are to remain in the plant bed the amount of ventilation should be increased by leaving the cover off a greater portion of the time, in order to harden the plants to outdoor conditions. After a time the covering may be left off all the time, but it should be kept where it can be put on quickly in case of a late spring frost. No matter how well the sweet potato plants are accustomed to open-air conditions they will be injured by the slightest frosting. The covering for the plant bed will last many years if stored in a dry place during the period that it is not in use. A roof of boards or paper will serve as a covering for the plant bed, but these materials are not so easily handled as are the sash or canvas. Where no regular covering material is available its place may be taken by a layer of fine straw or grass spread evenly over the surface of the bed.

Some growers follow the practice of spreading about 3 inches of fine, fresh horse manure over the bed as soon as the sweet potatoes are bedded; this serves both as a covering and to retain the moisture. When the sprouts begin to appear, a portion of the manure must be removed to prevent the plants from becoming too long and slender.

BEDDING THE SEED.

In the warmer portions of the sweet-potato-growing district the seed should be bedded when danger of frost has passed. In the northern portion of the area the seed should be placed in the hotbed from the 20th of March to the 10th of April, after the temperature of the bed has fallen to 80° or 85° F. and become regular.

If possible, select a warm, sunny day for this work, in order that the seed potatoes and the bed may not become chilled. The soil to be used for covering the potatoes should be sifted beforehand and placed in piles in the bed, where it will have become warm and in good condition for use. Leaf mold is perhaps the best material with which

to cover the potatoes, but where this can not be obtained a fine, rich, sandy loam is the best substitute.

Before placing the seed in the bed, an inch or more of the finely sifted covering material should be spread evenly over the surface of the regular soil in the bed. The potatoes are spread upon this bed, each one being placed by hand so that they will not touch, and about one-half of the bed surface is covered. If extra large potatoes are employed for seed they may be split lengthwise and placed with the cut side down in the bed. When the potatoes are in place, cover them to a depth of about 3 inches, water by using a sprinkling can, and then watch the temperature of the bed carefully until the potatoes have formed an abundance of sprouts.

TEMPERATURE OF THE PLANT BED.

As noted above, the temperature of the plant bed should be about 80° or 85° F. at the time the seed is bedded, and should gradually fall until it remains stationary at 58° or 60° F. at the end of six weeks, or before planting-out time. A thermometer should be kept plunged in the soil of the bed and the temperature noted every day for the first ten days or two weeks. If the manure hotbed is not located in a well-drained situation there is danger of soil water getting in with the manure and either destroying the heat altogether or starting a second fermentation which will cause the temperature to run too high and injure the potatoes. The air temperature beneath the sash or other covering should run between 60° and 80° F., and during bright days it must be controlled by ventilation. As the time for planting in the field or garden draws near, the plants should be given more exposure to harden them to outdoor conditions.

MOISTURE REQUIREMENTS OF THE PLANT BED.

The amount of water required by the plant bed will depend somewhat upon the method of heating employed. With a steam-heated or furnace-heated bed more watering will be necessary than if the ordinary manure hotbed is used. The watering given when the potatoes are bedded will generally be sufficient to last for several days, but after the plants begin to form leaves and the cover is left off during the greater part of the day, watering will be necessary every day. The water should never be poured on in a solid stream, but by means of a sprinkling can or a rose, or nozzle, on the end of a hose. Where very large plant beds are employed it will be necessary to keep some one in almost constant attendance to care for the watering, heating, and ventilation. The success of the crop depends largely upon the character of the plants, and proper management of the plant bed is essential to the production of the right kind of plants.

“DRAWING” THE SETS.

As a general rule sweet potato plants are set in the field shortly after a rain. In order to avoid delay in planting, the hands should begin to get out the sets as soon as the rain ceases falling and place them in crates or baskets ready for transportation to the field. The sets are not all produced at once, and only those that have formed good roots are “drawn,” the others being left until later. In “drawing” the sets the seed potato is held down with one hand while the plants are removed with the thumb and finger of the other hand. It often happens that five or six plants will cling together at the base, and these should be separated in order to avoid loss of time in

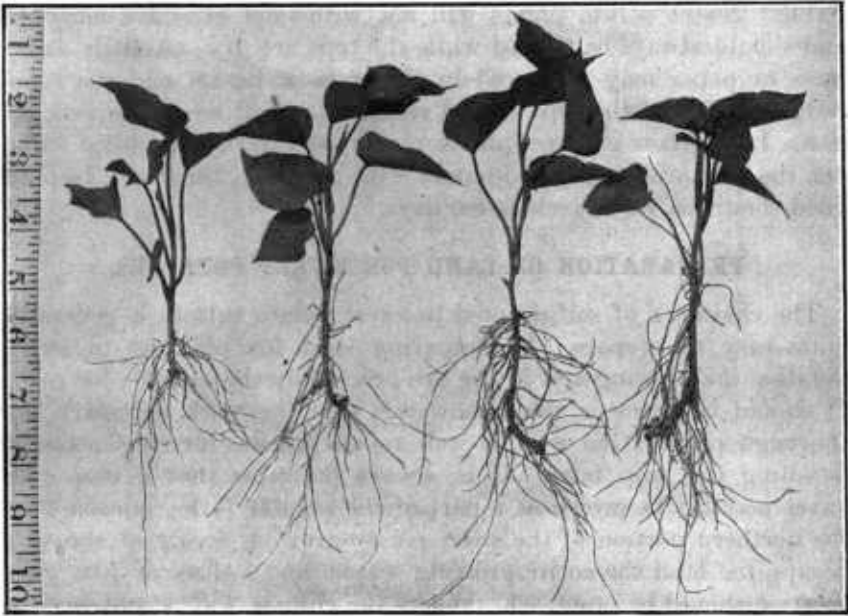


FIG. 7.—Sweet potato sets, or “drawings.”

the field. Where plants are to be set with a transplanting machine it is essential that they should be in the best possible shape in order that they may be handled rapidly by the boys who feed the plants into the machine. The roots should all be kept in one direction, and if the tops are long or irregular they may be trimmed off even by means of a knife.

While “drawing” the sets it is a good plan to have at hand a large pail or a tub containing water to which there has been added a quantity of clay and cow manure which has been stirred until it forms a thin slime. As the plants are pulled from the bed they are taken in small bunches and their roots dipped into this mixture. This

process, termed "puddling," covers the roots with a coating which not only prevents their becoming dry in handling but insures a direct contact with the soil when they are planted in the field or garden. Figure 7 shows four sets that are at slightly different stages of growth; those on the right are in prime condition for planting. After removing the sets that are ready, the bed should be watered to settle the soil where it has become disturbed and then left for the younger plants to develop.

PACKING PLANTS FOR SHIPMENT.

In preparing sweet potato plants for shipment or for sale, they are "drawn" from the bed and tied in bunches of 100 each with soft string. Sweet potato plants will not withstand excessive moisture and should always be packed while the tops are dry. A little damp moss or paper may be placed in the crate or basket and the roots bedded in it, but the tops should remain dry and have free ventilation. If the roots of sweet potato plants are carefully puddled without the mixture coming in contact with the tops, they will keep in good condition for a week or ten days.

PREPARATION OF LAND FOR SWEET POTATOES.

The character of soil devoted to sweet potato culture is generally quite easy to prepare. In preparing land for planting to sweet potatoes the plowing and fitting are practically the same as for corn. It should be borne in mind, however, that the work necessary for thorough preparation will be well repaid by the increased ease in handling the crop later. It is always desirable that a crop like sweet potatoes be grown as a part of the regular farm rotation. In the northern portion of the sweet-potato-growing area the crop will occupy the land the entire growing season, and a three or four year rotation should be practiced. Where the climate will permit, a crop of early snap beans, peas, or cabbage may precede the sweet potatoes, but in any case the land should not be planted to sweet potatoes oftener than once every three years. A good rotation is to devote the land to corn one year, sowing crimson clover in the alleys between the rows at the time the corn is given the last cultivation. During the following spring the crimson clover should be turned under and sweet potatoes planted; then in the autumn, after the potatoes are harvested, the land may be plowed, fitted, and sown to rye or winter oats with plenty of grass seed. In this way a crop of grain may be obtained during the time that the grass is becoming established. Allow the land to remain in grass one or two years and then repeat the rotation. Where corn is followed by sweet potatoes in the rotation, stable manure should be applied while fitting the land for the

corn, and commercial fertilizers should be applied with the sweet potato crop.

As previously mentioned, the depth of plowing has considerable influence upon the character of the product. The usual depth of plowing in preparing land for corn will prove satisfactory for sweet potatoes. The fact that sweet potatoes are not planted in the field until quite late in the spring makes it possible for the grower to select a time when conditions are favorable for the preparation of the land. Plowing may be deferred until the soil has become sufficiently dry to break up fine and mellow. It is important that the land should be harrowed within a few hours after plowing; further fitting may be deferred until later, and if the soil is inclined to be lumpy the work of pulverizing may best be done shortly after a shower and while the lumps are mellow. When the primary work of preparation is finished, the soil should be mellow to a depth of 6 or 7 inches and the surface smooth and even. Subsequent handling of the soil preparatory to planting will depend upon whether ridge or level culture is to be followed.

APPLICATION OF FERTILIZERS.

For the general good of the land commercial fertilizers should be applied broadcast, but the majority of farmers feel that they can not afford to do this and that the quantity that they are able to apply will give greater returns when placed in the row. This is a matter for the decision of each grower and will depend greatly upon the capacity of the soil under consideration for retaining fertilizers from year to year.

PREPARATION FOR PLANTING.

After plowing and fitting the land it is generally allowed to lie several days before being put in shape for planting. If level culture is to be practiced, the only thing necessary will be to run the harrow over the soil once and then mark in both directions at the desired distances for planting. The marking is generally done with either a one-horse plow, a flat-soled marker, or a disk marker. The disk marker is well adapted to this work, as it throws up a slight ridge which furnishes fresh earth in which to plant. Some growers who practice level culture mark the ground with a small one-horse plow and throw up a slight ridge upon which to plant; behind the plow a roller is used to compress this ridge to a low, flat elevation.

Where the more universal ridge method of planting is employed the soil is thrown up by means of a turning plow or a disk machine. The ridges should be made at least one week before planting, in order that the soil may become settled and compact. The majority of

sweet-potato growers make the ridges whenever the land is in good condition to work and then either roll or drag the tops just ahead

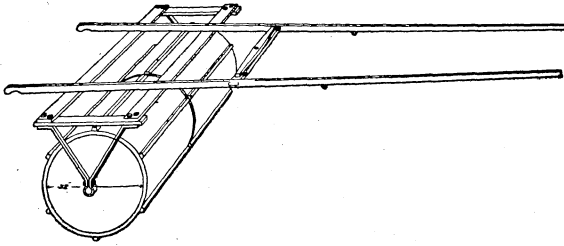


FIG. 8.—Roller for marking distances to plant.

of the planters. By using a roller similar to that shown in figure 8 the ridges at one operation can berolled and marked the proper distances for planting. A drag suitable for

smoothing the tops of the ridges can be easily constructed by cleating together three pieces of 2 by 4 inch scantling.

SETTING THE PLANTS.

The success of the crop depends largely upon the way in which the plants start after being removed from the bed and set in the field or garden. Practical growers always plan to set the plants during a "season" or period when the conditions are suitable to a quick start into growth, either just before a rain or as soon afterward as the soil can be worked. The method of setting will depend entirely upon local conditions and the acreage to be grown, the essential features, however, being to get the roots in contact with moist earth and the soil firmly pressed about the plants.

The use of water around the roots of the plants is desirable under most circumstances, as it not only moistens the soil but assists in settling it about the roots. A large quantity of wafer is not necessary, one-half pint to each plant being generally considered sufficient.

DISTANCES TO PLANT.

Where level culture is practiced, the plants are set from 24 to 30 inches apart in each direction. On the eastern shore of Virginia the greater portion of the crop is planted 24 inches apart each way, requiring about 11,000 plants to an acre. By planting 30 inches apart each way, only about 7,000 plants are required to set one acre. Where the crop is grown on ridges it is customary to have the ridges from 36 to 42 inches apart from center to center and to place the plants 14 to 18 inches apart in the row. By this method an acre will require from 8,000 to 12,500 plants. An acre of good sweet potato land will readily support 9,000 to 11,000 plants, and the number most commonly planted by the several methods will fall within these figures.

When planting for level culture the location of the plants will be indicated by cross marks, but for planting upon ridges it is necessary to provide some means of indicating the distances. This may

be accomplished in several ways, but a roller of the type shown in figure 8 having cleats nailed at equal distances around its surface is desirable and serves the purpose of both rolling and marking the ridges. Another device is constructed along lines similar to those of the ordinary wheelbarrow, pegs being placed upon the rim of the wheel to mark the planting distances. In using the wheelbarrow marker it is simply pushed along the top of the ridge. Another device of this class is constructed by placing three or four wheels upon a long axle and drawing it with a horse, the wheels being so arranged that they can be set at any point on the axle to provide for change in width of row.

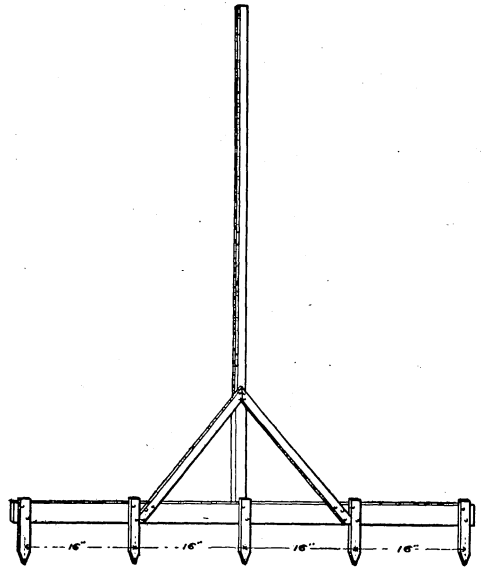


FIG. 9.—Drag or rake marker.

A very cheap and efficient marker can be constructed of 1 by 3 inch laths, as shown in figure 9. This marker can be used to indicate planting distances along one row, or by dragging it across the ridges the entire field can be marked before beginning to plant. The machine transplanters are provided with a spacing device which indicates the distance between plants; also with a row marker to show the location of the next row.

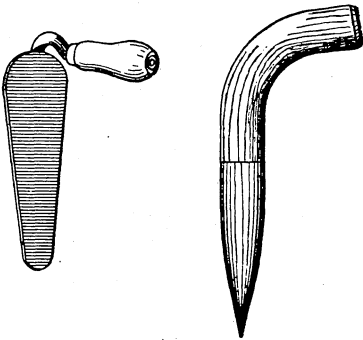


FIG. 10.—A trowel and a dibble used in setting plants.

SETTING BY HAND.

Where a few hundred plants are to be grown for home use or if only an acre or two are to be planted, the hand method of planting will answer every requirement. A trowel or a dibble, as shown in figure 10, is used for opening the soil to receive the plant, and the earth is closed about the roots by a second thrust with the implement, or the heel of the shoe is used to press the earth about the plant. For hand planting, the plants are dropped ahead of the "dibblers" by boys and girls. Seven thousand to ten thousand plants, or an acre,

is an excellent day's work for a planter when everything is in good condition. Where a few hundred plants are set in the garden it is



FIG. 11.—Setting sweet potato plants by hand.

always desirable to water them before closing the earth about the plant. Figure 11 shows the method of planting by hand.

PLANTING WITH TONGS.

Setting by hand is at best a back-breaking process, and numerous devices have been invented to save the bending of the body in hand planting. One of the simplest of these is a pair of wooden tongs with which the plant can be caught by the root and thrust into the soil. The plants are either dropped ahead or carried in a small basket strapped to the waist of the operator. The tongs are provided with a spring to throw the jaws apart, and are held in one hand while the plants are inserted with the other hand. In case the plants are dropped ahead, the root portion is grasped between the points of the tongs without the use of the hand.

An implement, known as a shovel, which is sometimes used in conjunction with the tongs, consists of a piece of lath sharpened to a flat point. This is used to open a hole in the soil ready for the plant. In using the tongs and shovel, the plants are dropped as for hand planting. The person doing the setting carries the tongs in the left hand and the shovel in the right. The plants are picked up by means

of the tongs, while a hole is made by inserting the shovel in the soil at the point where the plant is to be set. The plant is then inserted and the earth closed about it either by a second thrust of the shovel or by the foot of the operator. A man who is expert in the use of these homemade tools can set plants quite rapidly without bending the body sufficiently for the work to become tiresome.

A tool that is sometimes employed where vine cuttings are planted is a long dibble or a cane having a notch covered with cloth or leather in the lower end. The droppers lay the cuttings across the row at the proper distances and the planters place the notch over the middle of the cutting and force it into the soil with both ends protruding. A general idea of these devices may be gained from figure 12.

SETTING WITH MACHINES.

Where a large acreage is grown, the work of setting the plants in the field is greatly facilitated by the use of transplanting machines, of which there are several makes upon the market. The essential features of these machines are a device to open a small furrow, a tank for the supply of water, and disks or blades for closing the soil about the plants. With a transplanting machine it is not necessary to wait for a "season," as the machine automatically throws a small quantity of water around the roots of each plant as it is being set. In operating these machines it is necessary to have a steady team and two active boys who are trained to drop the plants at proper intervals, as indicated by a spacer on the machine. Under reasonably favorable conditions, a machine will plant from 3 to 4 acres a day. In addition to being labor savers, these machines do the work better and more uniformly than it is ordinarily done by hand.

The plants can be set without the use of water, but the results are more satisfactory where the water is used. A number of our most successful growers use water when setting after a rain, claiming that the water has the effect of settling the soil firmly about the roots of the plants and that they start into growth much more quickly. Where the full amount of water is used it will be necessary to provide a man and team to haul the water to the machine, but by this

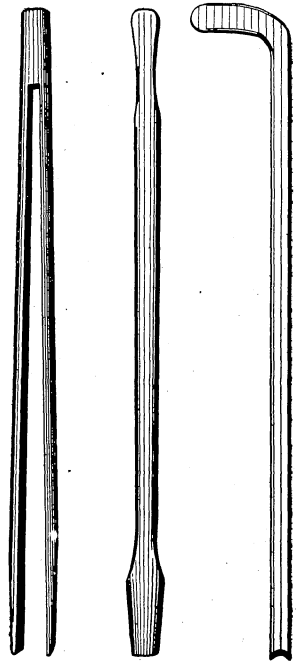


FIG. 12.—Tongs, shovel, and forked dibble for setting plants.

method plants may be set during dry weather without the loss of more than one plant out of every one hundred.

The majority of the transplanting machines are designed for planting either on the tops of ridges or on the level. The cost of setting an acre with one of these machines, using water, should be figured



FIG. 13.—Transplanting machine in operation.

on the basis of two teams with drivers and two boys for a period of three or three and one-half hours. If water is not used there will be a saving of at least one team and driver; also the time required for filling the tank on the machine. A transplanter in operation is shown in figure 13.

CULTIVATION OF SWEET POTATOES.

The methods of handling a crop of sweet potatoes do not differ materially from those employed with ordinary farm and garden crops. Within a few days after planting, a sweep or one-horse plow should be run in the alleys to break out the strip of earth left in ridging. The loose earth in the alleys should be worked toward the rows until a broad, flat ridge is formed upon which a small-tooth cultivator can be run quite close to the plants. After each rain or irrigation the soil should receive a shallow cultivation, and during dry weather frequent cultivations are necessary in order to retain mois-

ture. About two hand hoeings are generally necessary in order to keep the rows free from weeds and the soil loose around the plants. As hand labor is expensive, it should be the aim to perform the greater part of the work by means of horse tools. Where sweet potatoes are planted in check rows and worked in both directions the hand work required will be reduced to a minimum, but a certain amount of hoeing is always necessary.

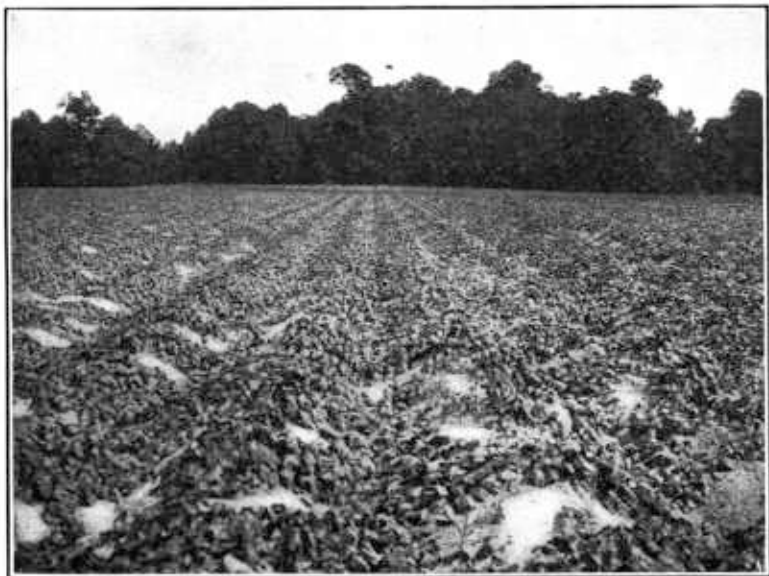


FIG. 14.—A field of sweet potatoes after the vines have practically covered the ground.

When the vines begin to interfere with further cultivation the crop may be "laid by," i. e., given a final working in which the soil is drawn well up over the ridges and the vines then allowed to take full possession of the land, as shown in figure 14. To do this it is often necessary to turn the vines first to one side of the row and then to the other by means of a stick or a wooden rake. After "laying by," very little attention is required until time for harvesting the crop.

TOOLS ADAPTED TO SWEET POTATO CULTIVATION.

Aside from planting and harvesting, the work of caring for a crop of sweet potatoes can be done almost entirely by the use of ordinary farm and garden tools. A two-horse riding cultivator is desirable for the general cultivation, and one having disks instead of hoes will serve for throwing the soil toward the rows. For the work of "laying by," a single-row celery hiller is suitable, or a one-horse sweep-

stock can be fitted with sloping boards and used for this purpose, as shown in figure 15. Many growers use a small one-horse turning



FIG. 15.—Device for hilling previous to "laying by."

plow for the final cultivation, going twice in each alley and working the soil toward the plants.

DISEASES.

The sweet potato is subject to injury from a number of diseases. Those diseases causing rot and decay are most prevalent and result in the greatest loss during the period that the crop is held in storage. Occasionally, however, the crop may be lost before harvesting, and one form of rot, known as black-rot, destroys the young plants, attacks the potatoes while they are in the ground, and causes them to decay while in storage. The spores that are responsible for the several forms of rot affecting sweet potatoes may remain in the soil from year to year, or they may be carried over winter upon the seed. Diseases are generally introduced with affected seed or plants, and when once established in the soil, the storehouse, or the propagating bed it is doubtful whether they can be eradicated except by the adoption of the most thorough methods.

BLACK-ROT OF THE SWEET POTATO.

As the black-rot (*Ceratocystis fimbriata*) is widely distributed and destructive, it is perhaps the only disease that will cause great difficulty. The black-rot may be easily detected upon the young

plants either in the form of a blackened and shriveled condition of the terminal buds or as small black spots on the main portion of the root. On the potatoes this disease first appears as brown patches upon the surface. These patches are generally quite irregular in outline and spread rapidly until the entire surface is covered. As the patches enlarge, the central portion becomes darker, often almost black. The presence of black-rot upon the potatoes can usually be detected at digging time, or more certainly when selecting the seed for bedding in the spring. Some idea of the appearance of this disease can be gained from figure 16.

OTHER DISEASES OF THE SWEET POTATO.

A disease known as stem-rot causes the stem of the plant to begin to die at the surface of the ground. This decay gradually extends downward to the potatoes and frequently kills the entire plant.

The diseases known as soft-rot, dry-rot, and white-rot are all similar in their method of attack to the black-rot. One form, known as soil-rot, causes the loss of the crop while it is in the field. Each of these diseases is caused by a particular fungus, but has received the common name suggested by its general appearance or some marked characteristic. Any one of the diseases of the sweet potato may be present without causing severe loss provided conditions are unfavorable to its development, and growers should be constantly on their guard to prevent the spread and development of diseases.

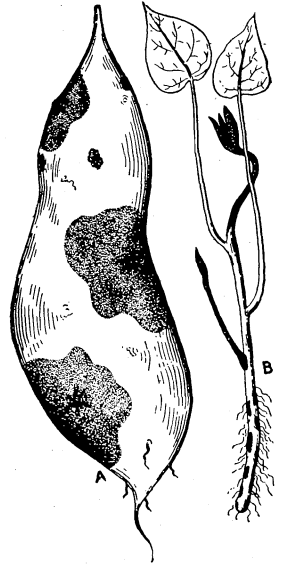


FIG. 16.—Sweet potato affected with black-rot: A, appearance of disease on potato; B, plant affected with black-rot. (Re-drawn from Halstead, Bulletin 76, New Jersey Agricultural Experiment Station.)

PREVENTION AND CONTROL OF SWEET POTATO DISEASES.

The diseases of the sweet potato have been under observation for many years, the New Jersey Agricultural Experiment Station having published a bulletin^a upon the subject in 1890, and this work has been supplemented by the results gained by numerous observers. The diseases of the sweet potato are now widely disseminated, and one or more of them may at any time prove destructive.

A system of crop rotation by which the land will not be planted to sweet potatoes oftener than every four or five years is the first step

^a Bulletin 76, New Jersey Agricultural Experiment Station, by Halstead.

toward disease control. Care in the selection and keeping of potatoes intended for propagation is of importance, while clean cultivation and proper handling at the time of harvesting are essential. Diseases will generally make their first appearance upon cut, broken, or bruised potatoes, and all that are in any respect injured should be stored separately from the seed and perfect stock. The storage house should be cleaned and fumigated with sulphur or formalin before storing begins, and all crates or baskets used for handling the crop should be in the house during the fumigation. Potatoes that show evidence of the presence of disease should not be used for propagation, and the hotbed should be cleaned and supplied with fresh soil each season.

It is very apparent that some varieties are more subject to the attacks of diseases than others. The Big-Stem Jersey and the Jersey group generally are especially subject to disease, while varieties of the Hayman group, such as Southern Queen, are seldom affected.

INSECTS.

The sweet potato is reasonably free from the ravages of insects. Cutworms frequently destroy the young plants after they are set in the field, especially when the land has been in grass the previous season. The sweet-potato borer, which works in the roots, is widely distributed and causes considerable injury in the Gulf Coast States. A small insect known as thrips works on the under side of the leaves during the hot and dry weather of midsummer, but as a rule the real damage caused by this insect is slight.

HARVESTING SWEET POTATOES.

TIME FOR DIGGING SWEET POTATOES.

The harvesting and marketing of sweet potatoes direct from the field begins about the middle of August and continues until the crop is all disposed of or placed in storage for winter marketing. During the early part of the harvesting season the yield is light, but as a rule the prices paid are good. The supply for home use and those potatoes that are to be kept in storage should not be dug until just before frost. In the localities where frosts do not occur until quite late in the season the sweet potatoes ripen and the vines show a slight tinge of yellow when ready for handling.

EFFECT OF FROST ON SWEET POTATOES.

The foliage of the sweet potato is very tender and is easily injured by frost. A light frosting of the leaves will do no harm, but should the vines become frozen before digging they should be cut away to

prevent the frozen sap passing down to the roots and injuring them. Where there is a heavy yield of potatoes the soil is frequently cracked or the ends of the potatoes protrude above ground and are liable to injury from severe frost.

If on account of rainy weather or for any other cause the potatoes can not be dug before frost or immediately afterwards, the vines should be cut away and the potatoes removed at the first opportunity. If cold weather continues it may be necessary to draw a little extra soil over the hills to protect the potatoes, or the vines may be piled in a ridge over the row. A very slight frosting of the potatoes will cause them to decay within a short time after being placed in storage.

METHODS OF HARVESTING SWEET POTATOES.

For digging a small area of sweet potatoes, the spading or potato fork illustrated in figure 17 is suitable. When digging by hand, the work will be greatly facilitated by first throwing a small furrow from one side of the row by means of a one-horse turning plow. The removal of sweet potatoes from the soil in large quantities is generally accomplished by the aid of sweet potato diggers or plows of the type shown in figure 18.

FIG. 17.—Spading fork adapted for digging sweet potatoes.

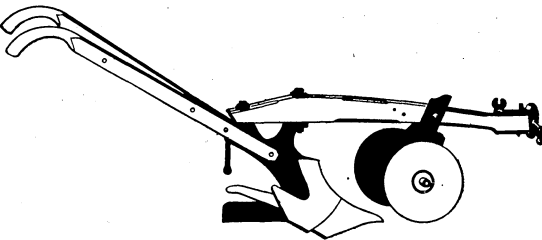
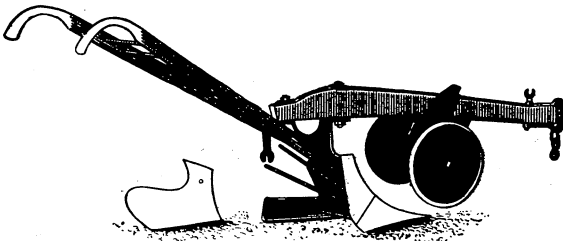


FIG. 18.—Special plows for digging sweet potatoes.

Where no special digging device is available, the ordinary two-horse turning plow is frequently used, a rolling coulter being attached to the beam to cut the vines. After plowing out the sweet potatoes

These implements are provided with two sharp rolling coulters that cut the vines ahead of the plow, and differ from the ordinary plow in having a moldboard that does not turn a furrow and terminates in a number of rods or an extension of the moldboard for separating the potatoes from the soil.

it will be necessary to stir the soil in order to find those that become covered. The machines employed for handling Irish potatoes may be used for digging sweet potatoes, but are not entirely satisfactory for this purpose, as they bruise and otherwise injure sweet potatoes.

It is desirable that the soil should be comparatively dry at the time of harvesting sweet potatoes, and bright, drying weather is essential to the proper handling of the crop. Sweet potatoes differ from Irish potatoes in that they are not so easily injured by sunlight. However, they should not be exposed for any length of time if the sunshine is very warm. During the handling in the field it should be the purpose to remove all soil and surface moisture from the potatoes. Sweet potatoes should not lie exposed upon the surface of the ground during the night.

MARKETING DIRECT FROM THE FIELD.

Where sweet potatoes are grown in large quantities for early marketing it is the practice to dig, pack, and load, all on the same day, direct from the field. As the potatoes are gathered up behind the diggers they are sorted into the various grades and packed into ventilated barrels ready for shipment. When the barrels are packed in the field they are as a rule covered with burlap or similar material. In parts of New Jersey the potatoes are sorted in the field and gathered into five-eighths-bushel baskets, in which they are hauled to the depot platform, where they are packed into barrels and headed. More than one-half of the commercial crop is marketed direct from the field without the use of packing sheds or storage of any kind other than that provided by the transportation companies.

GRADING AND PACKING.

In sorting sweet potatoes preparatory to packing, about four grades are recognized, as fancy, primes, seconds, and culls. Those packed as fancy include only the most select, both in size and shape. The primes include all those adapted to general first-class trade, while the seconds include the smaller and more irregular stock which goes to a lower priced trade. The culls are not marketed unless good stock is exceedingly scarce, and as a rule are used for feeding to hogs.

Sweet potatoes are usually shipped in barrels holding eleven pecks each. Some markets require that the barrels be faced and headed, while for others the tops are slightly rounded and covered with burlap. Small lots of extra-fancy sweet potatoes are sometimes shipped in one-bushel crates having raised tops; also in patent folding crates.

Throughout the process of handling care must be exercised to see that the sweet potatoes do not become bruised, for upon this their shipping and keeping qualities greatly depend.

STORAGE OF SWEET POTATOES.

METHODS OF STORING.

Unlike most perishable products, the sweet potato requires warmth and a dry atmosphere while in storage. The method of storing will depend both upon the locality and the quantity of potatoes to be cared for. The temperature and conditions of a rather cool living room are admirably adapted for keeping sweet potatoes intended for home use in the North, while in the South they may be placed in pits or stored in outdoor cellars. The home supply may be placed in crates and stored in a loft over the kitchen part of the dwelling. Sweet potatoes should not be stored in bags or in barrels without ventilation.

PITS AND CELLARS.

Where large quantities of sweet potatoes are stored for winter marketing, the method employed in the Southern States is to place them in outdoor pits and cellars, while at the North some form of heated storage house will be required. Whether the storage be in pit, cellar, or house, a dry, warm atmosphere with ventilation is essential to good keeping.

Storage pits should be located where the drainage is good. First, a little of the surface soil is thrown back to form a level bed 8 or 10

feet in diameter; then two small trenches crossing each other at right angles in the center of the bed are excavated and some boards laid over these. At the point where the trenches cross, a loosely nailed 4 by 4 inch box is set on end to form a flue up through the potatoes.

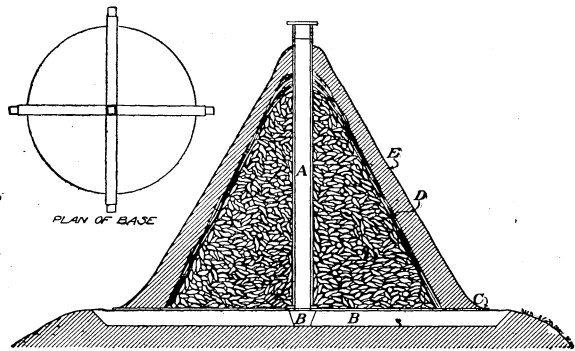


FIG. 19.—Section of outdoor pit: A, wood box for air shaft; B, trenches for admission of air; C, board covering trench; D, straw or pine needles; E, soil.

potatoes. The earth floor of the pit should be covered with 2 or 3 inches of hay, leaves, or pine straw, and the potatoes piled in a large, conical heap around the ventilator flue. When the heap is of the desired size, the potatoes are covered with hay or pine straw, and soil to the thickness of 5 or 6 inches is added, but the trenches and flue are kept open until it is necessary to close them to keep out the frost. In the South sweet potatoes are frequently kept throughout the winter by this method. A cross section of this type of pit is shown in figure 19.

OUTDOOR CELLARS.

The type of storage cellar illustrated in figure 20 is extensively used throughout the South. This form of cellar is built entirely above ground and consists of a line of posts through the center supporting a ridgepole upon which is placed one end of planks or puncheons with their opposite end resting on the ground on either side of the

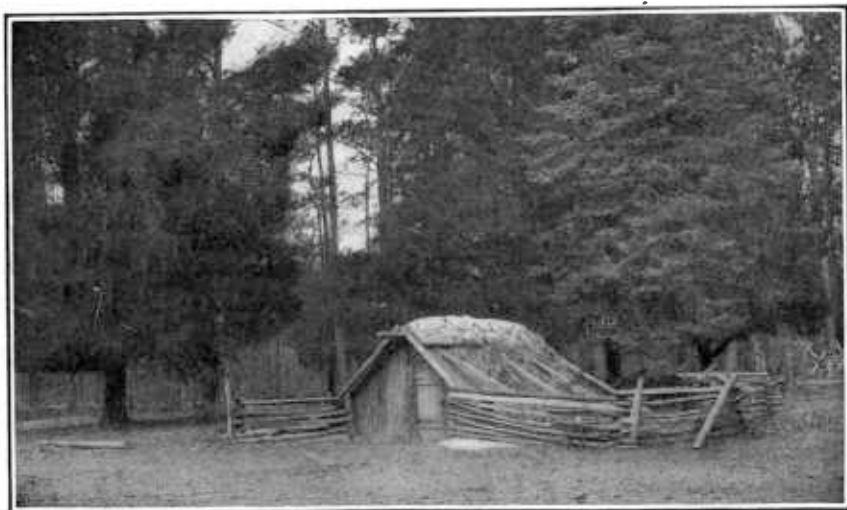


FIG. 20.—Outside cellar. Such cellars are extensively used throughout the Southern States for the storage of root crops.

ridge. The ends of the inclosure are boarded up, a door being provided in one, and the structure covered with sod to a thickness of 5 or 6 inches. The sweet potatoes are stored upon the earth floor and the door is kept open for a time for ventilation. If the house exceeds a length of 12 or 14 feet, a top ventilator should be provided.

STORAGE HOUSES.

In the North, where the winters are too severe for the use of the pit and the outdoor cellar, some form of regular storage house is employed. These houses are constructed with frost-proof air-space walls, and provision is made for heating during the curing period and severely cold weather.

The usual method of constructing storage houses is to first put down a concrete foundation, upon which a frame of 2 by 4 inch and 2 by 6 inch scantling is reared. On the outside a sheathing of 1-inch lumber is nailed, preferably diagonally, to add strength to the building. Over this sheathing heavy building paper is applied and a covering of "drop" or "lap" siding put on. The roof may be of tin or shingles, or one of the better grades of prepared paper roof-

ing will answer. Inside the building, paper is first tacked to the studding, and then one thickness of $\frac{3}{4}$ -inch matched lumber is nailed on. The ceiling may be carried upon the rafters or squarely across, with several openings into the space above for ventilation. Where the ceiling is attached to the rafters, it is desirable to first nail 1-inch strips to the rafters and then run the matched ceiling up and down, in order that any condensed moisture will follow down the grooves to the sides of the house rather than drop upon the potatoes.

The floor may consist of boards, concrete, or hard clay. The bins for holding the potatoes may be constructed of 2 by 4 inch scantlings and 1 by 4 inch strips, a convenient size of bin being about 20 feet in length by 12 feet in width and 10 feet deep. The bins

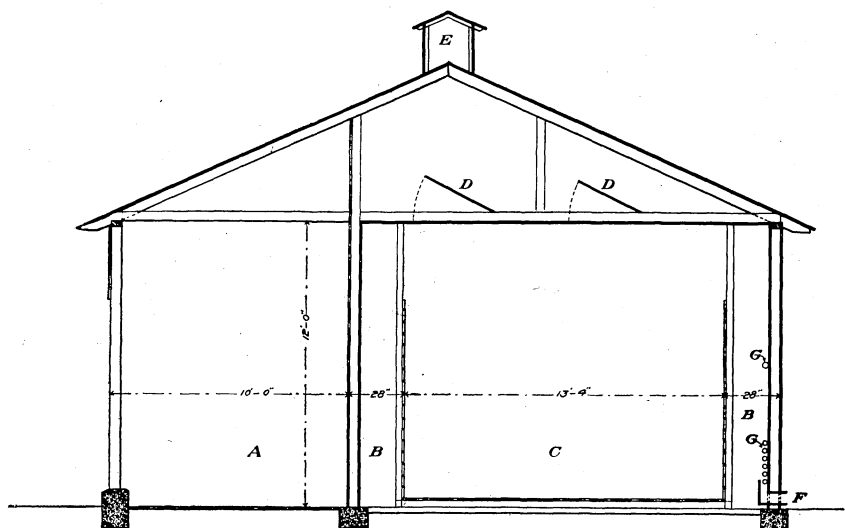


FIG. 21.—Cross section of large storage house: A, driving shed; B, space between outer walls and potato bins; C, storage bins; D, ceiling ventilators; E, top ventilator; F, bottom ventilator; G, heater pipes.

should be built 14 to 18 inches away from the outside walls and a 4-inch space should be allowed between the bins. A floor of narrow boards raised a few inches above the regular floor will provide for a free circulation of air through the potatoes. The size and number of bins will depend entirely upon the quantity of potatoes to be stored. For each 100 bushels of potatoes to be stored a space of 125 cubic feet will be required. A bin of the dimensions given above, if filled to a depth of 8 feet, will hold about 1,500 bushels of sweet potatoes.

Brick or concrete storage houses are desirable, but require to be lined with wood in order to be dry and warm. The greater number of storage houses in use are of frame construction, and any building which is dry, which can be properly ventilated, and in which the proper

temperature can be maintained will be found suitable for storing sweet potatoes. If a house is built expressly for the purpose it is possible to provide many convenient features, including heating appliances and loading and unloading platforms, and a covered driveway along one side is desirable. Very few windows are required in the storage house, and these should be provided with tight shutters to keep out light and cold. A cross section of the type of storage house in general use is shown in figure 21.

STORING THE CROP.

In housing the crop the potatoes are hauled to the house in five-eighths-bushel baskets or in bushel crates and spread upon special tables for sorting.



FIG. 22.—Wagon and baskets adapted for transporting sweet potatoes from the field to storage house or shipping point.

Where large quantities of sweet potatoes are to be handled from the field to the storehouse or shipping point, it is desirable to employ wagons specially fitted for the purpose. If the road is at all rough, the wagons should be provided with bolster springs to lessen the jolting of the potatoes. A wagon for this purpose should have rather low broad-tire wheels and a shallow box or framework fitted for holding the baskets or crates. The wagon shown in figure 22 is the type used by the growers of New Jersey and is well adapted to the handling of a large number of baskets. For hauling barrels an ordinary hay rack is desirable. The ordinary wagon box, or bed, is not adapted to the handling of either baskets, crates, or barrels.

The seed stock for planting the following year should be selected and stored separately in a small bin. As the potatoes are separated into their respective grades they are put into baskets and carried to the bins.

Some growers prefer to do the grading in the field, but this necessitates the employment of a larger percentage of expert labor and delays the work of getting the potatoes hauled to the storehouse. Women and children can pick up the potatoes in the field, and two or three experienced men can do the sorting and grading at the house in a much shorter time and in a more satisfactory manner.

The most desirable form of table upon which to spread sweet potatoes for sorting consists of a wooden framework over which strong burlap or canvas is stretched. This forms a hollow surface from which the potatoes will not roll or become bruised in handling. The sorting tables should be placed alongside of the unloading platform and where the distance to the storage bins is short. If a shed is provided at the side of the storehouse, the sorting tables should be along the side nearest the bins, the wagons being driven on the outside and the baskets of potatoes to be sorted unloaded under the shed.

Before starting to fill a bin, 2 or 3 inches of dry pine needles, straw, or chaff should be placed upon the floor. Beginning at the back of the bin the potatoes are piled to a depth of 30 or 40 inches until the entire floor space is covered and a number of slats are required to be placed across the doorway opening. A few grain bags filled with straw should be placed upon the potatoes at intervals from front to back of the bin, and upon these planks on which the men may walk while carrying in the next layer of potatoes may be laid. In this way a bin may be filled to a depth of 8 or 9 feet by about three layers. By dumping them in layers the potatoes have an opportunity to become thoroughly dry before a new layer is placed over them.

TEMPERATURE AND VENTILATION OF STORAGE HOUSES.

Two or three days before beginning to bring in the potatoes, the storage house should be thoroughly cleaned and the heating appliance put in working order and started, in order to have the house both warm and dry when the crop comes in. Throughout the time of storing and for about ten days after the potatoes are all in the bins a temperature of 85° or 90° F. should be maintained in the house, with plenty of ventilation. This constitutes what is known as the sweating or curing process, and the keeping qualities of the potatoes depend upon the thoroughness with which this part of the work is done. Wood-burning stoves are frequently employed for heating sweet potato storage houses, but a hot-water boiler with coils of pipes along the walls of the building is very satisfactory.

After the crop is all in and thoroughly cured, the temperature of the storage house should be gradually lowered and may vary between 55° and 65° F., but considerable ventilation should be maintained.

Sweet potatoes should be handled very carefully and as few times as possible, the essentials to good keeping being a reasonable degree of warmth, a dry atmosphere, and careful handling. Great care should be taken with the seed for the next year's planting to see that it is carefully handled and properly stored.

While a temperature of 80° or 85° F. is required to properly start the seed into growth in the spring, a higher temperature during a long period of time in storage is liable to injure or even kill the buds. Potatoes intended for seed should not be stored in too great quantities, and where but a small supply is needed they can often be kept buried in dry sand after having first been thoroughly cured. The sand used for this purpose should be baked to insure the driving off of moisture, and may be placed around the potatoes while slightly warm.

In controlling the ventilation of the storage house during the winter months, outside air should be admitted only when quite dry and when its temperature is lower than that of the air in the storage house. If warm, moist air is admitted considerable moisture will be deposited upon the potatoes, thus injuring their keeping qualities.

LOSS FROM SHRINKAGE WHILE IN STORAGE.

Under proper storage conditions sweet potatoes will shrink from 6 to 10 per cent, but the loss in weight will be greater if the temperature of the house is carried too high. If the potatoes are not mature when dug from the field the loss from shrinkage may be as much as 15 per cent, and immature stock should be marketed early in the winter.

MARKETING DURING WINTER MONTHS.

For marketing from outside pits it is desirable to have the quantity stored in one pit small enough to permit of all being removed at one time. The potatoes may be removed from outdoor cellars as desired. In marketing from heated storage houses the potatoes should not be disturbed until they are barreled or crated, and then they should be placed directly upon the market and sold without delay.

When shipping during cold weather the barrels should at least be lined with paper, and a covering of heavy brown paper over the outside of the barrels will form a safeguard. If the potatoes are shipped in carload lots during the winter the cars should be either of the regular refrigerator type or felt lined, and in some cases a stove

should be provided. When once placed upon the market the potatoes should reach the consumer within a comparatively short time.

Figure 23 shows the type of barrel employed; also the method of pressing the heads into place.

VARIETIES OF SWEET POTATOES.

Of the large number of varieties of the sweet potato there are not more than ten that are now of great commercial importance in the United States. For the markets that require a dry, mealy-fleshed potato those



FIG. 23.—Sweet potato barrels and device for pressing the heads into place.

varieties belonging to the Jersey group are suitable. For the southern trade and where a moist-fleshed potato is desired those commonly designated as yams are in demand. Among the Jerseys that are extensively grown are the Big-Stem Jersey, the Yellow Jersey, and the Red Jersey. The principal varieties of the yam group are the Southern Queen, the Pumpkin Yam, the Georgia, the Florida, and the Red Bermuda. Of the varieties mentioned there are a large number of special strains, known under many local names.

In the selection of varieties for home use one must be governed largely by locality. As a rule those of the Jersey group will thrive farther north than those of the so-called yam types. For market purposes the particular variety or strain grown in the vicinity should first be selected, and afterward other varieties may be experimented with in a small way.

The following brief descriptions of a few of the leading varieties may be of assistance in selecting those best adapted to various conditions of soil and climate:

Big-Stem Jersey.—This variety (fig. 24, C) is the most popular among growers who are supplying the northern and eastern markets. It is a form of the Yellow Jersey, having been selected for its productiveness and dry, yellow flesh. The vines are slender and long; the potatoes are of spindle shape and inclined to grow rather large;

color of potatoes yellow; color of flesh light yellow or deep cream. While this variety yields heavily, it is unfortunately a rather poor keeper, and its flesh is inclined to become dry and "punky" toward spring. It will thrive well toward the north, but is better adapted for use as a commercial variety than for home consumption.

Yellow Jersey.—The vines of the Yellow Jersey variety are long and more slender than those of the Big-Stem Jersey, and the potatoes are of spindle shape, but much smaller; otherwise the two varieties are very similar in appearance. The flesh is dry and mealy. This variety is a fairly good keeper and retains its quality well. It is adapted for home use and thrives under a wide range of conditions, but does not yield heavily enough for commercial purposes.

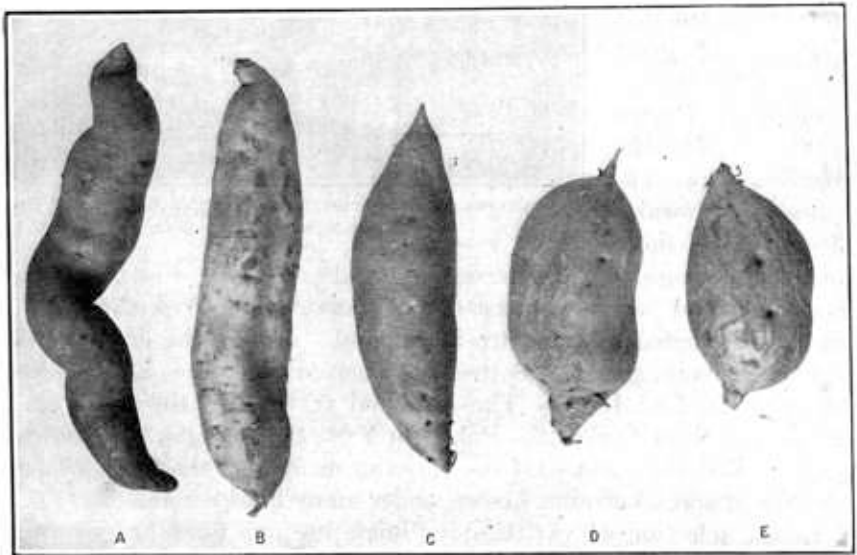


FIG. 24.—Some of the commercial types of sweet potatoes: A, Black Spanish, or "Nigger Choker"; B, Long, cylindrical type; C, Jersey group, spindle shape; D, Red Bermuda; E, Southern Queen.

Red Jersey.—This is similar to the Yellow Jersey variety, except that the roots are red and it is more productive under most conditions. It is suitable for home use.

Southern Queen, or Hayman.—The vines of this variety are strong and vigorous; the potatoes are large, thick, and blunt at ends or of short spindle shape; the color is white or light cream, while the flesh is of cream color, becoming darkened in cooking, moist, and very sweet. This variety is most extensively grown for market purposes where a sweet, moist-fleshed potato is demanded. The Southern Queen yields well, is an excellent keeper, and is adapted for both

marketing and stock feeding and for home use in the South Atlantic and Gulf Coast States, but it does not mature when grown in the extreme North. (See fig. 24, E.)

Pumpkin Yam.—The vines are vigorous, short, sometimes of a bunch habit. The potatoes are of short spindle shape or quite round, with a dull yellow color on the outside. The flesh is orange or sometimes yellow and marbled with orange; it is moist and has a flavor very similar to that of good squash. This variety yields well and is adapted to home use and to stock feeding throughout the South.

Georgia, or Split-Leaf, Yam.—The vines of this variety are slender and long; the potatoes of medium size, spindle shape, yellow; the flesh a light yellow, marbled with salmon. The quality of this variety is excellent and very sweet, but it is a light yielder. It is a splendid sort for home use throughout the South Atlantic and Gulf Coast States.

Red Bermuda.—The Red Bermuda vines are large and vigorous. The potatoes are usually large and overgrown with heavy ridges and veins. The color of the potatoes is rose red; flesh, creamy; quality fair but not so sweet as Southern Queen. This variety is a heavy cropper and suitable for feeding to stock. It is one of the few so-called yams which thrive in the northern portion of the sweet potato area. (See fig. 24, D.)

Florida.—The vines of the Florida variety are large and vigorous. The potatoes are rather large, light salmon yellow, smooth and regular, of short spindle shape, with light yellow flesh. This variety is not so sweet as the Georgia and is inclined to be dry and mealy. It yields fairly well and is adapted for home use.

Pierson.—The vines of the Pierson are similar to those of the Red Bermuda variety. The potatoes are light yellow, of short spindle shape, very rough, with cream-colored flesh. This sort is extensively grown for the earliest market, but it is of only fair quality. It yields well if allowed to remain until late in the season.

Black Spanish, or "Nigger Choker."—The Black Spanish vines are very long, vigorous, and dark purple in color. The potatoes are long, cylindrical, crooked, or bent; dark purple in color, with snowy white flesh and poor quality. This variety is grown mostly for stock feeding. (See fig. 24, A.)

Shanghai.—The vines of the Shanghai variety are large and vigorous; the potatoes long, cylindrical; the outside color almost white. The flesh is creamy white, becoming darker in cooking. When baked the flesh is somewhat dry and mealy and the flavor rather poor. This variety yields fairly well and is adapted for use as stock food in the Gulf Coast States. (See fig. 24, B.)

COST OF PRODUCTION AND RETURNS.

The cost of growing an acre of sweet potatoes will vary with the cropping plan and the extent to which the crop is grown. On an average the cost of growing an acre of sweet potatoes in the regular commercial district is about as follows: Rental of land, \$8; plowing and fitting, \$5; fertilizers, \$20; 10,000 plants, \$10; planting, \$5; cultivating, \$5; digging and marketing, \$25; total, \$78. An average yield of sweet potatoes is at the rate of one barrel to 100 hills or 100 barrels to an acre. The price per barrel paid the grower is seldom less than \$1.25, and \$2.50 or \$3 is not uncommon. During good seasons the net profit from one acre of sweet potatoes is about \$75. While occasionally the net returns are from \$100 to \$150 an acre for a single season, there are seasons of crop failure or overproduction when very little, if any, profit is realized.

The sweet-potato growers on the eastern shore of Virginia as a rule plant about 10 acres in sweet potatoes, and this constitutes their money crop. The remainder of the cleared portion of their small farms is devoted to corn, pasture, and hay, all for home use. Here the sweet-potato crop is grown almost entirely without the aid of hired help, and the cost of production does not exceed \$40 an acre. Where the crop is stored the gross returns are greater, but the cost of production is increased proportionately.

USES OF SWEET POTATOES.

The uses of the sweet potato as a table vegetable are too important and too well known to require more than brief mention in a publication of this character. In preparing them for the table they are baked, boiled, fried, or braised, while for pies they are used in the same manner as pumpkins.

A number of attempts have been made to build up an industry for the production and sale of desiccated sweet potatoes and sweet-potato flour. There is doubtless a great field for this class of goods, especially for export and for ship supplies.

USES FOR STOCK FOOD.

The vines of the sweet potato when properly cured make a medium grade of hay for feeding to cattle and sheep. In the green state the vines are eaten by sheep, cattle, and hogs, but their feeding value is comparatively small. The potatoes are fairly well adapted to feeding to range cattle, sheep, and hogs, although their nutritive value is quite low and they require the addition of cotton-seed meal or grain to make a balanced ration. On farms where sweet potatoes are grown extensively the culls are fed to hogs, together with a one-third or one-half ration of corn.

By employing one of the heavy-yielding varieties of sweet potatoes, such as the Southern Queen or the Bermuda Red, and drying and pulverizing them, a splendid stock food may be produced, especially when sufficient grain is added to form a balanced ration.

The principal uses of sweet potatoes are, however, for the table, and the demand for this purpose is rapidly increasing.

From the fact that by the aid of commercial fertilizer alone sweet potatoes can be grown on comparatively poor land and largely by the use of labor-saving machinery, this crop may in a great measure solve the problem of how to occupy the "worn-out" cotton and tobacco lands of the South, especially if employed in a rotation including corn, peanuts, and grass. By the perfection of some means by which sweet potatoes could be dried and converted into a condensed stock food on the farm, they in conjunction with corn, peanuts, and a little hay would serve to keep the stock on southern farms in good condition during the winter.

When removed from the ground the sweet potato contains about 71 per cent of water, 1.5 per cent of protein, 25 per cent of nitrogen-free extract, and 0.35 per cent of fat. It will be noted that both the protein and fat content of the sweet potato are comparatively low. The analysis of peanuts shows that the protein and fat are both quite high, and by combining them with sweet potatoes at the rate of one bushel of peanuts, ground in the shells, to three bushels of sweet potatoes a splendid stock food is produced. Three bushels of sweet potatoes are nearly equal to one bushel of corn in feeding value, but in order to make them satisfactory as a stock food it is necessary to add peanuts, cotton-seed meal, or grain.

USE FOR PRODUCTION OF ALCOHOL.

The starch and sugar content of sweet potatoes varies considerably in different varieties, but as a rule they contain about 16 per cent of starch and 4 per cent of sugar, making a total of 20 per cent of alcohol-producing material. It is possible that sweet potatoes will become one of the chief sources of denatured alcohol in the United States, but at present the methods of manufacture have not been sufficiently perfected to warrant their use for this purpose on a farm or community basis.